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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,580	03/14/2001	Hyuk Chang	030681-287	1344

7590 06/18/2003

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EXAMINER
YUAN, DAH WEI D

ART UNIT	PAPER NUMBER
1745	9

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/805,580	CHANG ET AL.	
	Examiner	Art Unit	
	Dah-Wei D. Yuan	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,9-15 and 17* is/are rejected.

7)☒ Claim(s) *2,7,8,16 and 18-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

MONOPOLAR CELL PACK OF PROTON EXCHANGE MEMBRANE FUEL CELL AND DIRECT METHANOL FUEL CELL

Examiner: Yuan S.N. 09/805,580 Art Unit: 1745 June 2, 2003

Detailed Action

1. The Applicant's amendment filed on April 16, 2003 was received. Claims 1,2,9,11 were amended. Claims 17-20 were added.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (Paper No. 8).

Claim Rejections - 35 USC § 112

3. The claim rejections under 35 U.S.C. 112, second paragraph, on claims 1-16 are withdrawn, because claims 1,2,9,11 have been amended.

Claim Rejections - 35 USC § 102

4. The claim rejections under 35 U.S.C.102(e) as being anticipated by Walsh (US 6,110,612) as evidenced in Kordesch et al. (Fuel Cells and Their Applications) on claims 1,6,9-11,15 are maintained.

With respect to claims 1,9,11, Walsh teaches a polymer electrolyte membrane fuel cell pack comprising at least four fuel cell stacks as shown in Figures 10 and 11. A structure (10) is disposed between two adjacent fuel cell stacks. An electrical connection means (98) is used to connect fuel cell stacks across the structure; i.e., the electrical connection member is positioned

in the hollow space as defined by the two faces 18 and 22. Anode end plates and cathode end plates are disposed at either end of the cell stacks. The structure (fuel flow stopper) directs the flow of fuel to the anode side of the fuel cell, whereas the air/oxygen to the cathode side of the fuel cell. The fuel cell stacks might be arranged differently from what is shown in Figure 10. Moreover, the hollow structure is considered as an intermediate layer, which is provide with fuel supply (16,20) and discharge (12) means. Because of safety concern, the use of a sealing member would be inherently in order to seal the anode of the cells to prevent accidental mixing of fuel and oxidant in the fuel cell system. See Column 3, Lines 25-42; Column 4, lines 49-61; Column 5, Lines 12-21. Walsh does not specifically teach the presence of a porous fuel diffusion member and a porous air diffusion member in the fuel cell stack. However, it is the position of the examiner that such components are inherent in conventional proton exchange membrane fuel cell. This is evidenced in Kordesch et al., in which two porous carbon diffusion electrodes are in contact with the Nafion membrane. See pages 75-76, in particular, section 4.3.3.2. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999). With respect to claims 6 and 15, the porous air diffusion member has flow channels through its thickness as shown in Figure 4-18 of Kordesch et al. With respect to claim 10, the fuel is supplied to the anode through fuel source (16), which is located at the center of the fuel cell stacks. See Figure 1.

Claim Rejections - 35 USC § 103

5. The claim rejections under 35 U.S.C.103(a) as being unpatentable over Walsh (US 6,110,612), Kordesch et al., (Fuel Cells and Their Applications) and Besmann et al. (US 6,037,073) on claims 3-5,12-14 are maintained.

Walsh and Kordesch et al. disclose a fuel cell pack as described above in Paragraph 7. However, Walsh and Kordesch et al. do not disclose that the gas diffusion membrane is a carbon-plastic composite. Besmann et al. teach the fabrication of a single monolithic electrode/diffuser (diffusion member) fuel cell component. The component is prepared using a mixture of carbon fibers and phenolic resin powder. The resulting electrode/diffuser can avoid fluid leaks and ohmic losses generally associated with conventional discrete separator/gas diffusion plate. See Column 2, Lines 52-24; Column 3, Lines 1-5; Column 4, Lines 36-40. Therefore, it would have been obvious to one of ordinary skill in the art to use a carbon-plastic composite as the porous fuel diffusion member and air contact member in the fuel cell pack of Walsh and Kordesch, because Besmann et al. teach the gas diffusion members made of carbon-plastic composite have superior property in terms of less fluid leaks and ohmic losses.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh (US 6,110,612) in view of Kordesch et al., (Fuel Cells and Their Applications).

Walsh teaches a polymer electrolyte membrane fuel cell pack comprising at least four fuel cell stacks as shown in Figures 10 and 11. A structure (10) is disposed between two adjacent fuel cell stacks. Electrical connection means (98) is used to connect fuel cell stacks

across the structure; i.e., the electrical connection member is positioned in the hollow space as defined by the two faces 18 and 22. Anode end plates and cathode end plates are disposed at either end of the cell stacks. The structure (fuel flow stopper) directs the flow of fuel to the anode side of the fuel cell, whereas the air/oxygen to the cathode side of the fuel cell. The fuel cell stacks might be arranged differently from what is shown in Figure 10. Because of safety concern, the use of a sealing member would be inherently in order to seal the anode of the cells to prevent accidental mixing of fuel and oxidant in the fuel cell system. See Column 3, Lines 25-42; Column 4, lines 49-61; Column 5, Lines 12-21. Walsh does not specifically teach the presence of a porous fuel diffusion member and a porous air diffusion member in the fuel cell stack. However, it is the position of the examiner that such components are inherent in conventional proton exchange membrane fuel cell. This is evidenced in Kordesch et al., in which two porous carbon diffusion electrodes are in contact with the Nafion membrane. See pages 75-76, in particular, section 4.3.3.2. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999).

However, Walsh does not teach the use of collector plates respectively contacting the cathode and the anode in each cell in the fuel cell pack. Kordesch et al. teach the use of bipolar electrodes (collector plates), which are in contact with the anode and cathode, respectively, in the fuel cell system. See Figure 3-15. The bipolar current collector is a logical consequence of the stacking of many cells in series to obtain a high stack voltage. See pages 49,50. Therefore, it

would have been obvious to one of ordinary skill in the art to incorporate bipolar current collectors in the fuel cell pack of Walsh, because Kordesch et al. teach the use of a bipolar electrode to achieve high stack voltage in a fuel cell system.

Allowable Subject Matter

7. Claims 2,7,8,16,18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 2,18 would be allowable because the prior art does not disclose or suggest the fuel inlet and fuel outlet are disposed on the anode end plate. Claims 7,16,19 would be allowable because the prior art does not disclose or suggest the electrical connection member has a shape of a mesh. Claim 8,20 would be allowable because the prior art does not disclose or suggest through holes in the collector correspond to those in the cathode end plate one to one.

Response to Arguments

8. Applicant's arguments filed on April 14, 2003 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) Walsh references does not teach the limitation "electrical connection member being positioned in the hollow space";

(b) the cathodes and anodes do not actually enter in the structure 10;

(c) Walsh reference teaches the adjacent cell stacks are electrically connected instead of adjacent cells as stated in the claim;

In response to Applicant's arguments, please consider the following comments.

(a) the electrical connection member (98) is positioned in the hollow space as defined by the vertical faces, i.e., 18 and 22. See Figure 1;

(b) Walsh teaches the structure 10 comprising a number of openings to internal passages for guiding the fuel, oxidant and water of the reaction process into and out of the fuel cell stacks. See Column 3, Lines 25-18. Therefore, the anode and cathode of the fuel cell stacks (88) are connected to the structure in a gas-tight manner;

(c) the fuel cell stacks in the Walsh reference are composed of fuel cells. The electrical connection member (98) is considered to connect between adjacent cells;

Conclusion

9. **THIS ACTION IS MADE FINAL**. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (703) 308-0766. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Dah-Wei D. Yuan
June 2, 2003

CAROL CHANEY
PRIMARY EXAMINER